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10/748,569	12/30/2003	Leonard Ciprian Mosescu	MSFT-2832/304070.01	8073

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EXAMINER	
BROWN, SHEREE N	
ART UNIT	**PAPER NUMBER**
2163	
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12/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/748,569	MOSESCU, LEONARD CIPRIAN	
	Examiner	Art Unit	
	Sheree N. Brown	2163	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 15 October 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,2,5-10 and 13-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,5-10 and 13-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is responsive to the Amendments received on 06/13/2007. Claims 1-2, 5-10 and 13-19 are pending and presented for examination.

Claim Objections

2. Claims 17 is objected to because of the following informalities: Claim 17 notes "ORIGINAL", however this claim has been amended. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-2, 5-10 and 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ambroziak (US Patent No. 6,055,526, Date of Patent: April 25, 2000) in view of Bumbulis (US Patent No. 2003/0204513, Date Filed: January 27, 2003).

<u>Claim 1:</u>

Regarding claim 1, Ambroziak teaches a system for compression comprising: a memory device that stores a plurality of compressed and uncompressed normalized index keys in sorted order (column 16, lines 37-39, wherein sorting is performed on the C/P groups arrange the concepts in order of there concept identifiers, Ambroziak), with no gaps

between the stored normalized keys (column 9, lines 49-50, wherein most fries related to the invention are stored in compressed form, Ambroziak), and stores a plurality of slots with no gaps between the stored slots (column 1, lines 52-58, wherein compressing an index to obtain a compressed index that is easily stored and transmitted, also providing for decompression of such a compressed index, wherein it further provides maintenance and use of a plurality of files that contain indexing information Ambroziak); and

Ambroziak teaches a processor that compresses the stored normalized keys (Figure 2, diagram 210, wherein processor hardware is illustrated, Ambroziak).

Ambroziak is silent with respect to a b-tree data structure wherein a processor that compresses the stored normalized keys, wherein each slot corresponds to a normalized index key in the memory page and comprises a memory offset of the corresponding key and an indicator if the corresponding normalized index key is compressed.

On the other hand, Bumbulis teaches a b-tree data structure wherein a processor that compresses the stored normalized keys, wherein each slot corresponds to a normalized index key in the memory page (paragraph [0068-0069], wherein a query tree is normalized by the normalizer; paragraph [0085], wherein it is also assumed that all keys can be normalized to binary strings in an order preserving fashion; paragraph [0240], wherein for existing B-Tree index implementations, this overhead is usually between 12 and 41 bytes for internal nodes and between 8 and 37 bytes for leaf nodes, depending

on the length of the normalized keys and the length of the normalized prefix stored in each page, wherein this is equivalent to "wherein each slot corresponds to a normalized index key in the memory page", Bumbulis) and comprises a memory offset of the corresponding key (Figure 7B, all features, wherein it illustrates the bit offsets and keys associated with the internal nodes and leaf nodes of the Patricia tree, Bumbulis and an indicator if the corresponding normalized index key is compressed (paragraph [0140], wherein this reads over "a blind search of a Patricia tree or path-compressed binary tree structure typically starts at the root node with an examination of the bit at the specified offset to determine if it is zero ('0") or one ('1 ") and based upon whether the bit being examined is a "0" or "1 ", the search proceeds to the left or to the right, and this process continues until a leaf node is reached, wherein this is interpreted to be equivalent to wherein "an indicator if the corresponding normalized index key is compressed", Bumbulis).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate Bumbulis teachings into Ambroziak system. A skilled artisan would have been motivated to combine as suggest by Bumbulis [see abstract] to facilitate quick access by minimizing the size of a b-tree utilizing path compressed binary tile.

Claims 2:

Regarding claim 2, Ambroziak teaches wherein the memory device stores the plurality

of compressed and uncompressed normalized index keys starting after a header and the plurality of normalized index keys grows towards the end of the memory device as additional index keys are added (Figure 4, wherein block 3 is illustrated as the header and column 14, lines 45-55, wherein format of document file data structure, wherein the data structure begins with a byte of information used to store compression factor or key for compression, wherein they byte information is followed by a plurality of bytes information, i.e. n bytes, wherein the compressed indexes are decompressed using the compression factor or key that precedes then in the document file, and the number of bytes used to store the compressed indexes, i.e. n bytes may vary depending on the compression factor or key used.; column 6, lines 1-5, wherein each subclass in the hierarchy may add to or modify the behavior specified in the parent class, Ambroziak).

Claim 5:

Regarding claim 5, Ambroziak teaches wherein the processor compresses the stored normalized keys on the memory page by:

(a) determining if a first normalized index key in a memory device should be compressed (Figure 14B, all features and Figure 15, all features, Ambroziak);

(b) comparing the first normalized index key with a second normalized index key preceding the first normalized index key in the memory device (column 17, lines 22-31, wherein the relevant concepts identifiers of the query are compared against the table to determine the C/P groups are relevant and lines 42-45, wherein the concept identifiers

for the relevant concepts f the query are compared to the MaxTable entries, and column 14, lines 1-8, wherein the two first and second index is defined, Ambroziak);

(c) generating a common byte length between the first normalized index key and the second normalized index key consisting of the number of bytes in the common prefix between the first normalized index key and the second normalized index key (column 11, lines 26-38, wherein concept entry has a structure that begins with a byte representative of the length of the concept or key, wherein the byte is followed by a byte denoting the length of the shared prefix and the shared prefix is a component of an entry that is common to another entry, for example, the preceding entry, wherein the byte denoting the length of the shared prefix is followed by an integer value indicating the concept identifier that is unique to the concept and following the integer value is a plurality of bytes of information, i.e. n bytes, used for storing the concept name or concept suffix, where n is the concept length., wherein the concept name is a portion of the concept that is unique among concepts having the same shared prefix, Ambroziak);

(d) replacing the first index key in the memory page with the generated common byte length followed by the bytes from the first normalized index key that were not in the common prefix between the first normalized index key and the second normalized index key (Figure 12, diagram 1205, wherein the existing microindex for the document is replaced with the new micorindex, wherein its further defined in column 19, lines 15-24, Ambroziak);

(e) shifting the normalized index keys following the first normalized index key to fill any empty memory space resulting from compressing the first normalized index key and updating the memory offsets contained in the slots corresponding to the shifted normalized index keys (column 9, lines 30-35, wherein jumping is equivalent to shifting, Ambroziak); and

(f) updating the indicator in the slot corresponding to the first normalized index key to reflect that the key is now compressed (column 9, lines 50-60, Ambroziak).

Claim 6:

Regarding claim 6, Ambroziak teaches wherein the processor repeating steps (a)-(f) for each normalized index key in the memory device (column 9, lines 15-18, Ambroziak).

Claim 7:

Regarding claim 7, Ambroziak teaches wherein the processor determining if a first normalized index key should be compressed comprises:

examining an indicator in the slot corresponding to the first normalized index key to determine if the first normalized key is already compressed and not compressing a key that has already been compressed (Figure 16A, all features wherein diagram 1603, identifying is equivalent to examining, Ambroziak); and

determining if the first normalized index key has a preceding index key on the memory device and not compressing a key that does not have a preceding index key on a memory device (column 11, lines 16-25, wherein a leaf block stores a header followed

by a series of lexicographically ordered entries, and an entry shares a prefix with a preceding entry, only the remaining suffix of the entry need be stored, wherein an entry describes a concept and a Concept is an element of information for which indexing is sought, Ambroziak).

Claim 8:

Regarding claim 8, Ambroziak teaches wherein the processor compresses the stored normalized index keys before a memory page split (Figure 16A, all features, wherein its further defined in column 20, lines 30-41, wherein in Figure 15, diagram 1505, entries in the file are compressed, Ambroziak).

Claim 9:

Regarding claim 9, Ambroziak teaches a system for compression comprising: storing a plurality of compressed and uncompressed normalized index keys in sorted order (column 16, lines 37-39, wherein sorting is performed on the C/P groups arrange the concepts in order of there concept identifiers, Ambroziak), in a memory page with no gaps between the stored normalized keys (column 9, lines 49-50, wherein most files related to the invention are stored in compressed form, Ambroziak);

storing a plurality of slots with no gaps between the stored slots (column 1, lines 52-58, wherein compressing an index to obtain a compressed index that is easily stored and transmitted, also providing for decompression of such a compressed index, wherein it further provides maintenance and use of a plurality of files that contain indexing

information Ambroziak);

storing a header (Figure 4, wherein block 3 is illustrated as the header, Ambroziak); and compressing the stored normalized keys on the memory page, wherein storing the plurality of slots comprising starting immediately at the end of the memory page and growing towards the beginning memory pages as additional slots are added (column 12, lines 1-10 and column 12, lines 48-50, respectively, Ambroziak)

Ambroziak does not teach further a b-tree data structure <u>wherein each slot corresponds to a normalized index key in the memory page and comprises a memory offset of the corresponding key and an indicator if the corresponding normalized index key is compressed.</u>

On the other hand, Bumbulis teaches a b-tree data structure wherein each slot corresponds to a normalized index key in the memory page (paragraph [0068-0069], wherein a query tree is normalized by the normalizer; paragraph [0085], wherein it is also assumed that all keys can be normalized to binary strings in an order preserving fashion; paragraph [0240], wherein for existing B-Tree index implementations, this overhead is usually between 12 and 41 bytes for internal nodes and between 8 and 37 bytes for leaf nodes, depending on the length of the normalized keys and the length of the normalized prefix stored in each page, wherein this is equivalent to "wherein each slot corresponds to a normalized index key in the memory page", Bumbulis) and comprises a memory offset of the corresponding key (Figure 7B, all features, wherein it

illustrates the bit offsets and keys associated with the internal nodes and leaf nodes of the Patricia tree, Bumbulis and an indicator if the corresponding normalized index key is compressed (paragraph [0140], wherein this reads over "a blind search of a Patricia tree or path-compressed binary tree structure typically starts at the root node with an examination of the bit at the specified offset to determine if it is zero ('0") or one ('1 ") and based upon whether the bit being examined is a '0" or "1 ", the search proceeds to the left or to the right, and this process continues until a leaf node is reached, wherein this is interpreted to be equivalent to wherein "an indicator if the corresponding normalized index key is compressed", Bumbulis).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate Bumbulis teachings into Ambroziak system. A skilled artisan would have been motivated to combine as suggest by Bumbulis [see abstract] to facilitate quick access by minimizing the size of a b-tree utilizing path compressed binary tree.

<u>Claim 10:</u>

Regarding claim 10, Refer to claim 2, wherein this limitation is substantially the same and therefore rejected under the same rationale, Ambroziak.

<u>Claim 13:</u>

Regarding claim 13, Refer to claim 5, wherein this limitation is substantially the same and therefore rejected under the same rationale, Ambroziak.

Claim 14:

Regarding claim 14, Refer to claim 6 wherein this limitation Is substantially the same and therefore rejected under the same rationale, Ambroziak.

Claim 15:

Regarding claim 15, Refer to claim 7 wherein this limitation is substantially the same and therefore rejected under the same rationale, Ambroziak.

Claim 16:

Regarding claim 16, Refer to claim 8 wherein this limitation is substantially the same and therefore rejected under the same rationale, Ambroziak,

Claims 17:

Regarding claims 17, Ambroziak teaches wherein the processor compresses the stored normalized keys on the memory page by:

(a) determining if a first normalized index key in a memory device should be compressed (Figure 14B, all features and Figure 15, all features, Ambroziak);

(b) comparing the first normalized index key with a second normalized index key preceding the first normalized index key in the memory device (column 17, lines 22-31, wherein the relevant concepts identifiers of the query are compared against the table to determine the C/P groups are relevant and lines 42-45, wherein the concept identifiers for the relevant concepts f the query are compared to the MaxTable entries, and column 14, lines 1-8, wherein the two first and second index is defined, Ambroziak);

(c) generating a common byte length between the first normalized index key and the second normalized index key consisting of the number of bytes in the common prefix between the first normalized index key and the second normalized index key (column 11, lines 26-38, wherein concept entry has a structure that begins with a byte representative of the length of the concept or key, wherein the byte is followed by a byte denoting the length of the shared prefix and the shared prefix is a component of an entry that is common to another entry, for example, the preceding entry, wherein the byte denoting the length of the shared prefix is followed by an integer value indicating the concept identifier that is unique to the concept and following the integer value is a plurality of bytes of information, i.e. n bytes, used for storing the concept name or concept suffix, where n is the concept length., wherein the concept name is a portion of the concept that is unique among concepts having the same shared prefix, Ambroziak);

(d) replacing the first index key in the memory page with the generated common byte length followed by the bytes from the first normalized index key that were not in the common prefix between the first normalized index key and the second normalized index key (Figure 12, diagram 1205, wherein the existing microindex for the document is replaced with the new micorindex, wherein its further defined in column 19, lines 15-24, Ambroziak);

(e) shifting the normalized index keys following the first normalized index key to fill any empty memory space resulting from compressing the first normalized index key

and updating the memory offsets contained in the slots corresponding to the shifted normalized index keys (column 9, lines 30-35, wherein jumping is equivalent to shifting, Ambroziak); and

(f) updating the indicator in the slot corresponding to the first normalized index key to reflect.that the key is now compressed (column 9, lines 50-60, Ambroziak).

Ambroziak is silent with respect to a b-tree data structure. On the other hand, Bumbulis teaches a b-tree data structure (paragraph [0004]). It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate Bumbulis teachings into Ambroziak system. A skilled artisan would have been motivated to combine as suggest by Bumbulis [see abstract] to facilitate quick access by minimizing the size of a b-tree utilizing path compressed binary tree.

<u>Claim 18:</u>

Regarding claim 18, Ambroziak teaches wherein the processor repeating steps (a)-(f) for each normalized index key in the memory device (column 9, lines 15-18, Ambroziak).

<u>Claim 19:</u>

Regarding claim 19, Refer to claim 7 wherein this limitation is substantially the same and therefore rejected under the same rationale, Ambroziak.

Prior Art of Record

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

*Ambroziak US Patent No. 6,055,526

*Bumbulis US PG Publication No. 2003/0204513

Response to Arguments

6. Applicant's arguments with respect to claims 1-2, 5-10 and 13-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

7. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheree N. Brown whose telephone number is (571) 272-4229. The examiner can normally be reached on Monday-Friday 7:00 AM - 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

S. Brown
December 21, 2007

WILSON LEE
PRIMARY EXAMINER